

Newark, Division of Water

ANNUAL REPORT
OF THE
DIVISION OF WATER
FOR
1932

Newark Division of Water

ANNUAL REPORT

DIVISION OF WATER

Mr. James W. Costello, Chief Engineer
Department of Public Affairs
Newark, New Jersey

ANNUAL REPORT

Dear Sir:

The annual report of the various Bureaus of the
Division of Water is herewith submitted.

DIVISION OF WATER

Respectfully
FOR

1932

HERMANN ROSENTHALER
DIVISION ENGINEER.

During the year of 1932, the
the Department and the Newark Supply was 70.4 million gallons, of which
3.4 million gallons were delivered to other jurisdictions.

PRECIPITATION ON WATERSHEDS

A period of long and severe drought which began late in
1928 continued into the fall of 1932 causing unusual drought conditions
during the summer of 1932. Because of the existence of the Newark supply,
Newark and other Newark participants were not faced with the serious water
shortage experienced generally in the northeastern states. Conditions
were relieved by a rainfall of more than 20 inches during the last three
months of the year, bringing the annual total to 52 inches as compared with

ANNUAL REPORT
OF THE
BUREAU OF DISTRIBUTION
(DIVISION OF WATER)

1932

Mr. Hermann Rosentreter, Division Engineer
Division of Water, Department of Public Affairs
Newark, New Jersey

Dear Sir:

The annual report of the Bureau of Distribution for the year 1932 is herewith submitted; reports of the Bureau of Inspection and of the Meter Laboratory are embodied in this report.

WATER SUPPLY

During the year of 1932, the average daily draft of water from the Pequannock and the Wanaque Supply was 50.4 million gallons, of which 8.4 million gallons were delivered to other municipalities.

PRECIPITATION ON WATERSHED

A period of less than normal precipitation which began late in 1929 continued into the fall of 1932 causing unusual drought conditions during the summer of 1932. Because of the existence of the Wanaque supply, Newark and other Wanaque participants were not faced with the serious water shortage experienced generally in the northeastern states. Conditions were relieved by a rainfall of more than 20 inches during the last three months of the year, bringing the annual total to 52 inches as compared with

the average of 48 inches.

CLEANING OF MACOPIN INTAKE

Cleaning operations at Macopin Intake were resumed on July 19, 1932. Although the work was retarded by the heavy rainfall during the months of October, November and December, the cleaning of the reservoir was completed on February 2, 1933.

WORK AT CEDAR GROVE

Considerable work was done by Emergency Relief Laborers at Cedar Grove Reservoir, which consisted of planting 270,000 seedlings in the nursery located on the westerly side of the reservation, grading and landscaping grounds in vicinity of the Chemical Laboratory and the North Dam.

RELAYING 36-INCH STEEL LINE

Due to exterior corrosion 2706 lineal feet of the 36-inch steel conduit extending from Belleville Reservoir to South Orange Avenue Reservoir was laid and relocated with 42-inch steel pipe. The sections relaid were 2266 lineal feet in Branch Brook Park from a point 275 feet south of Heller Parkway to Davenport Avenue and Fifth Street and 440 lineal feet under the Second River at the Newark and Belleville Line.

FIRE UNDERWRITER'S REPORT

In connection with a survey of fire-fighting facilities and fire hazards in the City of Newark made during 1932 by the National Board of Fire Underwriters, a most complete and careful investigation of the water supply system was undertaken. Addition to the works since the previous report in 1923 of the Wanaque supply, the 60-inch steel pipe line from Belleville Reservoir to the Elizabeth City Line, and 68 miles of distributing mains was particularly noted. Pressures were observed at 181 points throughout the system and improvement since the last report were found.

Fire flow tests indicated that in conjunction with the high pressure system, adequate quantities are available in the congested value district. Elsewhere, hydrant supply has been materially improved by feeder mains added since 1923. The report, however, calls attention to the fact that 57.4% of the Distribution System is composed of 4-inch and 6-inch mains and that where distribution is mainly through such mains pressures are not well sustained under heavy draft. It recommends the replacement of these mains with 8-inch pipe. In the 1933 budget an item is included for this program which is being carried forward as funds permit.

DISTRIBUTION SYSTEM

The total length of pipe owned by the city is now approximately 530.85 miles on the low pressure system and about 27.71 miles on the high pressure system. Connected with the mains on the low pressure system are 4,247 fire hydrants and 378 on the high pressure system; 7,923 gates control the flow of water in mains on the low pressure system and 236 gates on the high pressure system. There are about 71,475 connections, known as services, of which 58,730 are in use, through which water for domestic, commercial and public use is drawn. There are 297 connections on the high pressure system, of which 265 are in use. The average pressure on the low pressure system varies from 25 to 75 pounds, and on the high pressure system from 100 to 160 pounds per square inch.

STREET MAIN EXTENSION, LOW PRESSURE SYSTEM.

The total extension to street mains in the city during the year 1932 was as follows:

9,086 lineal feet = $1 \frac{3,806}{5,280}$ miles of from 4" to 24" diameter.

The amount of work done in relaying was as follows:

17,784 lineal feet = $3 \frac{1,944}{5,280}$ miles of from 6" to 42" diameter.

The amount of work done in lowering pipe was as follows:

565 lineal feet = $0 \frac{565}{5,280}$ miles of 8" to 24" diameter.

The approximate mileage of pipe of different diameters, deducting old pipe which was taken out and adding new pipe of larger size in place of the old pipe removed, consists of 2,802,862 lineal feet or 530- $\frac{4,462}{5,280}$ miles.

The number of low pressure taps made during the year was 97. Of these, 38 of 1-inch diameter, 11 of 1-1/2-inch, 18 of 2-inch, 9 of 3-inch, 9 of 4-inch and 12 of 6-inch.

The total number of low pressure taps in the city at the first of January, 1933 was 71,475, while the number of taps in actual use was 58,730. The difference shows the services to vacant lots installed in advance of new pavements.

During the year 73 hydrants were set. Of these 36 were substituted in place of old hydrants and 37 were added to the number already in place, 31 taken out and not replaced making the total number of hydrants:

In the City.....	4,199
Silver Lake Section and Belleville Reservoir....	<u>48</u>
	4,247

During the year 1932, the most important work done by the construction and maintenance forces of the Division on the Distribution System consisted of laying new mains, relaying existing mains with larger sizes, re-locating and lowering mains and the installation of new valves, hydrants and pressure regulators. Most of this work was done in connection with the new Pennsylvania Railroad Station layout, the new City Railway and

new State Highway construction. The work involved both the low and high pressure system. In addition thereto, the Distribution System was materially strengthened by the completion of a new 24-inch low pressure feeder laid between James Street and Eighth Avenue along Essex, Plane and Broad Streets. All of this work was done by the regular forces of the Division, supplemented by the use of Emergency Labor, a system devised during the year as a measure of unemployment relief, a considerable saving in the cost of the work being thus effected by the Division of Water.

STREET MAIN EXTENSION, HIGH PRESSURE SYSTEM

The extension of high pressure mains during the year 1932 was as follows:

1,367 lineal feet = $0 \frac{1,367}{5,280}$ miles of from 12" to 20" diameter.

Relaid 896 lineal feet = $0 \frac{896}{5,280}$ miles.

The approximate mileage of high pressure pipe of different diameters up to December 31, 1932 was as follows:

146,306 lineal feet = $27 \frac{3,746}{5,280}$ miles.

During the year 6 high pressure hydrants were set. Of these 1 was substituted in place of an old hydrant and 5 were added to the number already in place, 3 taken out and not replaced, making a total of 378 high pressure hydrants in the city. The number of high pressure taps made during the year was 1.

The total number of high pressure taps in the city at the first of January, 1933 was 297, while the number of taps in actual use was 265. The difference shows the services to vacant lots installed in advance of new improvement.

CONSUMPTION

The total amount of water diverted from the Pequannock Watershed during the year was 14,118.3 million gallons, also 4,359.3 million gallons was received from the Wanaque Watershed, which is an average daily of 50.4 million gallons. This is 2.1 million gallons less than the consumption of 1931. The average daily consumption in the City of Newark was 42.0 million gallons.

During 1932, 18 breaks on mains and 371 leaks on services were repaired, 1,304 poor pressures were investigated, 2,663 leaks were investigated and all services cleaned at main.

The use of hydrants by authorized and illegal users throws a heavy burden on the repair forces of the Division. In view of the fact that in 1932 it was necessary to make 981 repairs to hydrants (out of a total of 4,247) it is recommended that special standpipes be installed for the use of the street flushers.

GATE VALVE AND HYDRANT RECORDS

A more thorough system of gate valve and hydrant inspection was instigated during the year together with the development of a new form of Distribution System records for field use.

CONSUMPTION STATEMENT FOR YEAR ENDING DECEMBER 31, 1932.

1932	Total Consumption per Month, Million Gallons, Newark, Belleville, Bloomfield, Elizabeth, Nutley, Wayne.	Average Daily Consumption, Million Gallons, Newark and Suburbs.	Total Consumption per Month, Million Gallons, Newark.	Average Daily Consumption, Million Gallons, Newark.	Average Temperature, Newark.	Rainfall - Inches - Newark.
MONTH						
January	1506.9	48.6	1241.3	40.0	42.7	5.83
February	1421.6	49.0	1195.7	41.2	36.4	3.45
March	1473.1	47.5	1221.6	39.4	37.0	5.61
April	1390.9	46.4	1154.3	38.5	49.0	3.01
May	1473.8	47.5	1222.5	39.4	62.7	2.71
June	1575.9	52.5	1307.6	43.6	70.7	5.25
July	1685.6	54.4	1381.9	44.6	75.1	2.91
August	1703.2	54.9	1430.6	46.1	74.6	3.53
September	1603.8	53.5	1351.5	45.1	68.2	1.77
October	1593.8	51.4	1343.0	43.3	57.9	8.54
November	1491.3	49.7	1238.4	41.3	42.2	15.34
December	1523.1	49.1	1274.9	41.1	37.4	6.09
Total	18443.0	604.5	15363.3	503.6		64.04
Average		50.4		42.0		

Estimated Population of Newark by Board of Health, December 31, 1932 -- 452,000.

Estimated Population of Town of Belleville - December 31, 1932 -- 28,000.

Mr. Arthur R. Stemmler of the Bureau of Inspection reports that the men in his Bureau performed the following work during the year:

Meter Inspections.....	1,761
Service Inspections.....	2,499
Special Investigations.....	10,237
Special Meter Readings.....	3,792
Searches.....	167
Surveys.....	920
By-Passes Locked.....	116

Twenty-two water meters supplying other municipalities are read weekly.

Special efforts were made by the Bureau of Inspection in checking up on unmetered fire services in buildings and plants.

Seven hundred and twelve (712) inspections were made and one hundred and forty (140) foreign or cross connections from the sprinkler drain to the sewerage system were found.

The owners were notified to have these cross connections removed.

Mr. James Woolley of the Meter Laboratory reports that there were 57,695 meters of various makes in service on December 31, 1932, ranging in size from 1/2-inch to 16-inch. Of the 3750 meters removed to the Laboratory, 281 were found damaged by frost, 2728 meters found stuck, 182 found damaged by excessive heat, 559 meters for test at Laboratory, 661 meters were tested or repaired and tested on the premises and special work totaling 4,969 calls were attended to in the field. Total number of meters December 31, 1932, 57,695.

Respectfully submitted,

ROBERT O. SCHOLZ

ENGINEER IN CHARGE.

WILLIAM G. BANK

ASSISTANT DIVISION ENGINEER.

DIVISION OF WATER
SUMMARY OF STATISTICS OF THE NEWARK
NEW JERSEY, WATER WORKS
For Year Ending December, 31, 1932.

Population by census, 1930.....	440,000
Date of construction.....	1889-1891
By whom owned.....	City of Newark
Source of supply.....	Pequanneck and the Wanaque Watersheds
Mode of supply.....	Gravity

STATISTICS OF CONSUMPTION OF WATER

Population, City of Newark.....	452,000
Consumption for the year, City of Newark.....	15,363.3 m.g.
Consumption for the year, Town of Belleville.....	570.6 m.g.
Consumption for the year, Portion of Bloomfield.....	1,225.1 m.g.
Consumption for the year, Town of Elizabeth.....	913.0 m.g.
Consumption for the year, Town of Nutley.....	360.4 m.g.
Consumption for the year, Township of Wayne.....	10.6 m.g.

Total consumption for the year.....18,443.0 m.g.

Passed through meters in the city.....	13,299.38 m.g.
Percentage of consumption metered in the city.....	36.56 %
Average daily consumption, city and suburbs.....	50.4 m.g.
Average daily consumption in the city.....	42.3 m.g.
Gallons per day to each inhabitant in the city.....	92.92
Gallons per day to each tap in use in the city.....	711.93
Cost of supplying water per million gallons figured on total maintenance.....	\$35.53
Total cost of supplying water per million gallons figured on total maintenance, plus interest on bonds.....	\$149.49

STATISTICS REGARDING DISTRIBUTION SYSTEM

Mains, Low Water Pressure

Kind of pipe.....	Cast iron and steel
Size from.....	4-inch to 60-inch
Extended.....	9,086 feet during year
Discontinued.....	9,264 feet during year
Total now in use.....	530-4462/5,280 miles
Number of hydrants added during the year.....	37
Number of hydrants discontinued during the year.....	31
Number of public hydrants now in use.....	4,247
Number of stop gates added during the year.....	45
Number of stop gates now in use.....	7,923
Range of pressure on distributing mains.....	25 to 75 lbs.

Mains, High Pressure System

Kind of Pipe.....	Cast Iron
Sizes from.....	6-inch to 30-inch
Extended.....	1,367 feet during year
Discontinued	1,110 feet during year
Total now in use.....	27-37 46/5, 280 miles
Number of hydrants added during the year.....	6
Number of hydrants discontinued during the year.....	3
Number of public hydrants now in use.....	378
Number of stop gates added during the year.....	7
Number of stop gates now in use	236
Range of pressure on high pressure system.....	100 to 160 lbs.

Services, Low Pressure System

Kind of Pipe.....	Lead and cast iron
Sizes.....	5/8-inch to 6-inch
Number of service taps added during the year (5/8-inch to 6-inch diameter).....	97
Number of services abandoned.....	380
Number of services in the city.....	71,475
Number of service taps now in use (5/8-inch to 6-inch diameter).....	58,730
Number of meters added.....	167
Revised list of meters now in use.....	57,579
Percentage of services in use metered.....	93.04%

Connections, High Pressure System

Kind of pipe.....	Cast iron
Sizes.....	1 1/2-inch to 6-inch
Number of connections added during the year.....	1
Number of connections abandoned.....	3
Number of connections in the city.....	297
Number of connections in use (1 1/2-inch to 6-inch).....	265
Number of meters added.....	0
Number of meters abandoned.....	1
Revised list of meters now in use.....	116
Percentage of connections in use metered.....	43.77%

ANNUAL REPORT

OF THE

CHEMIST

(DIVISION OF WATER)

ANNUAL REPORT
OF THE
CHEMIST
(DIVISION OF WATER)

Mr. Hermann Rosentreter, Division Engineer
Division of Water, Department of Public Affairs
Newark, New Jersey

Dear Sir:

Submitted herewith is the annual report covering the activities of the Cedar Grove Laboratory, Division of Water for the year ending December 31, 1932.

The following number of samples from the various sources were examined, microscopical and bacteriological, as in the past.

<u>Source</u>	<u>Microscopical</u>	<u>Bacteriological</u>
Station #1 & 2 Great Notch.	594	615
Station #3 Cedar Grove Reser. Eff.	297	304
Station #6 Belleville Reser. Eff.	22	300
Station #7 Wanaque at Belleville.	305	299
Station #8 So. Orange Ave. Reser. Eff.	5	314
Station #9 & 10 City Taps	26	86
Station #16 Upper Macopin Intake	60	59
Station #17 Echo Lake Brook.	17	19
Station #20 Kanouse Brook	52	53
Station #25 Clinton Brook.	56	53
Station #30 Oak Ridge Brook.	67	54
Station #18 Timber Brook.	1	10
Station #19 Erwin Meadow Brook.	--	6
Station #31 Davenport Brook	--	11
Station #32 Wallace Brook.	6	11
Station #33 Oak Ridge Brook Coursen Rd.	--	11
New Distribution Lines in City	--	81
Cedar Grove Reser. Proper.	9	--
City Taps Special.	5	19
Watershed Special.	--	4
Weston Dead End Samples	--	9
Canistear Brook.	1	--
	1523	2318

MICROSCOPY

The detection of microorganisms in water is utilized for the express purpose of controlling those, that may affect its aesthetic quality, such as odor, taste and color.

An unusual amount of algae known as Ulothrix and spirogyra appeared in the Pequannock River during the period from June to September, which necessitated treatment with copper sulphate, at intervals. The algae showed a tendency to clog the screens at Macopin Intake and when it would reach our chlorination plant, the aesthetic quality was affected.

Since the advent of the chloramine treatment of Pequannock Water, the lower forms of microorganisms in Cedar Grove Reservoir were not so prevalent, however, a higher form, namely the Crustacea as Daphnia and Cyclops seemed to have increased during the summer months. While they do not cause an odor or taste they can be seen with the naked eye, hence affecting it in appearance. Cedar Grove Reservoir was treated with copper sulphate on July 8th and on August 19th, while Belleville Reservoir was treated on August 9th and 11th for these Crustacea.

Wallace Pond proved a little troublesome during the summer and had to be treated for Synura on August 26th and October 13th. At intervals this pond had to be sprayed due to a large accumulation of pond scum.

Oak Ridge Reservoir was low due to the continued drought and produced an ideal condition for the propagation of microorganisms. The result was that synura, Uroglana, Anabaena and a variety of protozoan and rotifera increased, necessitating the treatment of the reservoir proper with copper sulphate. The treatment took place on October 4th.

Oak Ridge Brook on account of poor aeration, concentration of organic matter due to the drought and a large accumulation of snake grass produced an odor. The brook at the time was ordered cleaned of weeds and this took place on August 23rd to the 25th, after which the odor slowly disappeared. Nuchar was resorted to as an experiment to remove the odor but was not very successful.

It is believed that the unusual trouble this past summer due to microorganisms was caused by the concentration of organic matter that acted as a food supply. This past summer was the first time in years that the Reservoirs in our watershed did not tip due to heavy runoff.

BACTERIOLOGY

The systematic bacteriologic examination of the water from the various sources were made as formerly. The procedures of the American Public Health Association and the United States Public Health Service, supplemented by methods we find better adapted to our own supply were followed in the laboratory. The latter methods serve for the purpose of checking the former.

At the request of Mr. R.S. Weston dead end samples were taken in Newark again to note the affect of chloramine in January.

On April 1st Mr. Brady of the State Board of Health, made an inspection of our Ammonia Treatment Plant, and in the course of his visit inspected portions of our Watershed. The results of his visit are given in his report.

South Orange Avenue Reservoir has proven a source of pollution to our water, that cannot to the fullest be controlled by chloramine treatment at Macopin intake. Permission was sought on June 13th and granted on July 8th from the State Board of Health to treat South Orange Avenue Reservoir with chlorine. The purpose of the treatment to eliminate positive gas formers. During August and part of September this reservoir was treated with M.T.M. Powder, twice weekly. The relief was only temporary and each time the reservoir was filled gas tubes occurred. Belleville Reservoir gave this same trouble until it was cleaned out, after which it was to the most extent eliminated. It is believed cleaning of South Orange Avenue might eliminate the trouble considerably. If not permanent, chlorination during the summer months would have to be resorted to.

During the summer months repairs on our aqueducts below the Intake at Macopin and the cleaning of the Intake proper necessitated the changing of the method and place of treatment of our water at intervals. It immediately

showed its effect on the bacteriological flora of our treated water.

In October a complaint was received from the Town of Nutley that a few children had been ill and that water was believed the cause. As we supply this town with Pequannock Water an investigation was made on October 7th. The water delivered at the time was found to be practically sterile. However, some incompetent people found their way into the case causing considerable annoyance, that on October 27th, another complaint was received. At this time the writer recommended that the State Board of Health be called in, as with the excess chlorine in our water it was improbable that infantile colitis (dysentery) or kindred bacteria could be found. On October 28th a representative of the State Board of Health and the writer visited the premises where illness occurred in Nutley. Samples were taken at these homes as well as at other sections of Nutley. The results of the tests showed that the water was not at fault. The report of the State Board of Health is given in their report on December 5th.

CHEMISTRY

A complete chemical analysis was made of the delivered Pequannock water monthly. Samples were taken at the Cedar Grove Reservoir Effluent.

On February 26th the Newark City Board of Health Laboratory complained that our Cedar Grove Reservoir showed Nitrites to be present and indicating recent pollution. While nitrites in untreated water are indicative of pollution, previous experiments conducted in the Cedar Grove Laboratory proved that our nitrites in Cedar Grove Reservoir were the result of the oxidation of some of the chloramine in cold weather. The chloramine being a combination of Chlorine and Ammonia used to sterilize our water.

In April the chlorine specifications were changed in order that a higher quality chlorine liquid free from pungent odors could be obtained.

During the year a number of samples were analyzed for the Bureau of Sewers.

With the entrance of Wanaque water into the Belleville Reservoir area a number of tests had to be made in order to trace the course of the Wanaque. A few

factories receiving Wanaque water complained and the water on analysis was high in Manganese causing it to be dirty.

PURIFICATION - CHLORINATION

The Vacuum Feed Chlorine machines functioned efficiently as heretofore. The ammoniator proved a source of trouble during the winter months, in that the ammonia would flow with difficulty. This was overcome by increasing the size of the manifold and installing a heating plant.

Ortho-tolidine tests are made hourly on both pipe lines when in use at the Macopin Intake to determine the chlorine residuals. These residuals were checked on both pipe lines at Great Notch.

On March 8th, anchor ice in our Pequannock River lessened the flow of water to the extent that for a short period of time sterilization had to be discontinued in our aqueducts.

A representative of the State Board of Health visited our watershed relative to inspecting our Ammonia Plant for approval on April 1st.

In order to improve the aesthetic quality of Pequannock water, efforts were made in the spring to clean out Cotter Pond and a pond in the Timber Brook section. Both these ponds were extremely high in organic color content, causing our water to contain a color much higher than that recommended by the American Public Health Association.

So as to obtain additional water, the Echo Lake Flume which previous had never been used was copper sulphated and chlorinated and placed in service on May 3rd.

In September experiments on the use of Muchar an activated carbon, was tried on Oak Ridge Brook in order to eliminate some prevalent odors. Further tests are contemplated in the future with Muchar.

The draining of Grinshaw Pond on Kenouse Brook was advised and undertaken during the summer.

WANAQUE SUPPLY

Daily Bacteriological, Microscopical and Chlorine residuals are made of Wanaque water at Belleville. As in the past Wanaque supplied a water of excellent bacterial quality. In February the diatoms had increased to an extent that a visit to the Wanaque Laboratory was made. It was found that they had commenced treating with copper sulphate.

On September 23rd Wanaque supply was sent through what is known as the Belleville Reservoir Level taking in the business section of Newark. Complaints immediately began to appear as to taste and dirty water. A complication arose in Wanaque at the same time. The presence of diatoms gave rise to odors. Efforts were made by the Wanaque Laboratory to eliminate them by excess chlorination, causing already precipitated manganese in the aqueducts to go into solution again, causing dirty water within the City of Newark. In addition Paterson pumping at Little Falls caused a surge that aggravated the condition. Upon entering Newark's own distribution lines further trouble occurred due to the extremely alkaline water entering our slightly acid or sometimes neutral water. After several complaints to Wanaque Laboratory the chlorine was lowered and the taste lessened. The turbidity remained and following a conference at Wanaque it was agreed that a surge tank be installed at Little Falls to take care of the surge due to pumping. This tank is now in the process of being erected.

It is the opinion of the writer that as long as Wanaque adds as much lime as they do considerable annoyance will take place at intervals. According to theory the water is soft after the lime is added, the manganese settles to a great extent in their aqueduct. Every so often some condition appears in their supply causing the black precipitated manganese to reach our distribution system. While Wanaque water is soft, elements present in our distribution system and in factory boilers combine with the monocarbonate lime, and manganese, causing it to be hard and corrosive.

RECOMMENDATIONS AND CONCLUSIONS

1. Oak Ridge Brook at Station #34 below dam should have its banks lined with stone to stop the erosive action of the water due to eddy currents. The contour of the stream at this location has changed the stream considerable in the past few years, during runoff high amorphous matter is the result. A series of rip raps in this stream would give a much needed aeration.

2. Kanouse Brook should be cleaned of weeds from Pequannock River to Grimshaw Pond. This stream from laboratory tests indicate that in summer no biological equilibrium takes place and it is a source of pollution. Due to putrefaction, spore formers exist requiring excess chlorine at the Intake. It is agreed that the amount of water from this stream is small, however, its bacteriological condition is far worse. By cleaning the stream the sun can act as a sterilizing agent. Grimshaw Pond should be drained and kept dry in summer. The swamp land below Grimshaw should be improved.

3. Temperature has shown itself to be a factor in making the natural grassy taste of surface water more pronounced in summer. It is believed by lowering Charlottesville Pond somewhat in summer, unnecessary storage of water in shallow areas can be avoided, partly checking algae growths.

4. South Orange Avenue Reservoir should be drained and cleaned of silt.

Respectfully submitted,

J.F.D. BAUERMANN

ASSISTANT BACTERIOLOGIST AND
CHEMIST IN CHARGE.

ANNUAL REPORT

OF THE

BUREAU OF WATER SUPPLY

(DIVISION OF WATER)

ANNUAL REPORT
OF THE
BUREAU OF WATER SUPPLY
(DIVISION OF WATER)

Mr. Hermann Rosentreter, Division Engineer.
Division of Water, Department of Public Affairs
Newark, New Jersey

Dear Sir:

I herewith present the annual report of the Bureau of Water Supply for the year ending December 31, 1932:

IMPROVEMENTS

The work personnel was augmented during part of the year by the emergency laborers provided by the City. They worked on a three day schedule, approximately 275 men per group. With the regular force as instructors in the most part, it was possible to clean the streams in the important major sections and do considerable work of tree trimming and brush cleaning on the roads in the Stockholm, Oak Ridge, Clinton and Timberbrook sections.

The emergency force with the regular men set out the seedling trees and cared for the nursery. Trees were planted along State Highway in the Clinton, Oak Ridge, Newfoundland, Canistota and Williamsville sections. The emergency work was terminated in July.

The wood stave pipe line was repaired, bridges, etc. built.

SANITATION

The usual rigid inspection of all public and private property in the 63.7 watershed area was continued. All garbage was removed, all toilets and cesspools, etc., inspected, the main disposal plant enlarged and improved and the streams and reservoirs inspected. Necessary additional disposal plants and toilets were built.

The public city rest areas caused considerable trouble by itinerant

FINANCIAL REPORT

W A T E R

1932